

Claims

1. A stepping motor comprising:

a bracket;

5 a housing having a first end coupled to the bracket and a second end having a reduced width compared with the first end;

a stator disposed in the housing to form electric field;

10 a first supporting unit formed on a first end of the bracket;

a magnet fixed corresponding to the stator to provide the magnetic field;

15 a second supporting unit supported on the second end of the housing;

a rotor supported by the first and second supporting units; and

a stopper fitted on an opened end of the second end of the housing to support the second supporting unit.

20 2. The stepping motor according to claim 1, further comprising a third supporting unit formed on a second end of the bracket to support a point of the rotor.

25 3. The stepping motor according to claim 2, wherein the third supporting unit comprises a hooking part formed by bending the second end of the bracket and a supporting member inserted in the hooking part.

30 4. The stepping motor according to claim 1, wherein the housing is formed in a single body.

35 5. The stepping motor according to claim 1, wherein the second supporting unit comprises a ball contacting an end of the rotor;

a thrust bearing contacting the ball; and

a spring biased between the thrust bearing and the stopper.

6. The stepping motor according to claim 5, wherein the spring is formed of a coil spring.

7. The stepping motor according to claim 5, wherein the thrust bearing contacts the second end of the housing.

8. The stepping motor according to claim 5, wherein the thrust bearing is formed of synthetic resin.

9. The stepping motor according to claim 1, wherein the stopper is separately prepared and fitted on the second end of the housing.

10. The stepping motor according to claim 1, wherein the stopper is cap-shaped.

11. The stepping motor according to claim 1, wherein the stopper is forcibly fitted or bonded on the second end of the housing.

12. The stepping motor according to claim 1, wherein the first supporting unit comprises a hooking part defined by bending an end of the bracket and a bearing installed on a penetrating hole of the hooking part.

13. The stepping motor according to claim 1, further comprising a pocket formed on an inner surface of the stopper.

14. The stepping motor according to claim 1, wherein the stator and the magnet are paired and spaced from each other.

15. The stepping motor according to claim 1, wherein the first end of the housing is coupled to the bracket by a welding or caulking process.

5 16. The stepping motor according to claim 1, wherein the second end of the housing has a diameter identical to that of a penetrating hole formed on the bracket.

10 17. The stepping motor according to claim 1, wherein the rotor is supporting by the first and second supporting units.

18. A stepping motor comprising:
a housing provided with a guide portion for guiding a
15 second supporting unit;
a stator installed in the housing to form electric field;
a rotor rotatably supported by the second supporting unit and inserted to be spaced away from the stator;
20 a magnet fixed on the rotor to correspond to the stator; and
a bracket having a third supporting unit in which a first side of the rotor is inserted, contacting an opening portion of the housing and a first supporting unit on which a
25 second side of the rotor is rotatably supported.

19. The stepping motor according to claim 18, wherein the housing is formed in a single body.

30 20. The stepping motor according to claim 18, wherein the guide portion has a reduced diameter compared with the opened portion.

35 21. The stepping motor according to claim 18, wherein the third supporting unit comprises a hooking part having a penetrating hole and a supporting member inserted in the

penetrating hole.

22. The stepping motor according to claim 18, wherein
the second supporting unit comprises a ball contacting an end
of the rotor;

a thrust bearing contacting the ball; and

a spring disposed on a rear side of the thrust bearing
to attenuate impact from the thrust bearing.

23. The stepping motor according to claim 18, further
comprising a stopper coupled to the guide portion to support
the second supporting unit.

24. A method for making a stepping motor, comprising
the steps of:

aligning a bracket and a single body housing using a
pin;

coupling the single body housing to the bracket;

inserting a rotor in the housing and the bracket; and

aligning a supporting unit on an end of the rotor.

25. The method according to claim 24, further
comprising the step of removing the pin before inserting the
rotor into the housing and the bracket.

26. The method according to claim 24, wherein the
housing comprises a guide portion in which the supporting
unit is disposed.

27. The method according to claim 26, further
comprising the step of fixing a stopper on the guide portion
after aligning the supporting unit.

28. The method according to claim 24, wherein the
bracket and the housing are coupled to each other by a
welding or caulking process.

29. The method according to claim 26, wherein the guide portion is formed through a deep drawing process.